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A NEW OPERATION

FOR

UNUNITED FRACTURE OF THE TIBIA.

BY

WM. H. PANCOAST, M.D., Etc.

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The first case, in which I tried the following procedure, was that of Catharine Smith, an inmate of the Philadelphia Hospital, in November, 1870.

Three years previous to this date, in attempting to elope from the hospital, she fell from the wall, and fractured the tibia of her right leg, at the lower part of the middle third. She was of medium stature, very stout, and about thirty years of age. When I saw her for the first time in the surgical ward, I examined her leg, and found a loss in the continuity of the tibia, of about three inches, at the middle third of the bone. She begged me to do something for her, even to amputate the leg if I thought proper. Saying that she was tired of remaining in the hospital; that she had been there over three years, and wished to leave, even if she left one leg behind her; that she was tired of being operated upon, and wished something decisive done. I promised to do what I could for her, desiring not to amputate if possible. On inquiring, I found that she had been skilfully treated, and everything done for her in the ordinary way of surgery. The fragments had been irritated by being rubbed firmly together; inflammation had been excited by perforating the ends of the fragments with an awl; a seton had been passed between them; an effort to establish union had been made by driving in ivory pegs; the integument had been laid open, and the fragments fastened together with silver wire, but all without success; and finally the integuments were again laid open, and the ends of the fragments resected, leaving the gap of three inches that I have mentioned.

On examining the leg, I found that the fracture had taken place, just below where the nutritious artery enters the bone, and had thus cut off the supply of arterial blood necessary for the proper effusion of plasma to make callus ; this, I presumed to be one of the reasons of the formation of the false joint. The main cause, however, appeared to me to be, that the fibula, which had remained unbroken, acted as a splint to the broken tibia. It being fastened by its ligaments, above, to the head of the tibia, and to its lower end, where the external and internal malleoli project downwards, making the socket for the astragalus, forming the ankle-joint. The last operation of resection only increased the difficulty, as the upper and lower fragments, being fastened to the fibula, were kept asunder the distance of three inches. At my next visit, the patient repeated her earnest request for an amputation. I answered her by saying that she had broken the tibia by a fall, and if she would tumble so as to break the fibula, I thought I could cure her. This she said she could not do, but she was willing that I should do anything I thought best for her. I asked her if she would permit me to break the bone. She said most cheerfully. On my next clinic day, having prepared her for the operation, I took her before my class. I described the case as above mentioned, stating that as the fibula acted as a splint, keeping the fragments apart, I proposed breaking it subcutaneously. Then forcing the lower fragments of both bones upwards, so that they would overlap the upper, I hoped that the fragments, thus approximated, would under the stimulus of the inflammation become united by callus.

I etherized the patient, and then with a strong gimlet, pierced the integument on the outside of the leg, and screwed it into the fibula, about three inches above the external malleolus, where this bone is still superficial. I withdrew the gimlet from the bone, but not from the integument, and slipping the point a little further upwards, I bored a second and a third hole in the same way. The fibula is narrow and does not give you much surface to work on, requiring for this purpose a gimlet, with a hard sharp point, that must be firmly and adroitly applied upon the bone. At the point where I had perforated and weakened the fibula, I now broke it; seizing the leg above and the foot below, and striking the leg at the perforated point on the edge of the bed. The bone broke with an audible snap. I then pushed up the lower part of the leg, endeavoring to make the bones overlap, avoiding too much force so as not to lacerate the arteries. The fragments approximated nicely, but did not overlap as much as I had hoped, owing to the amount of bone resected from the tibia, making the large gap, and from the pinching of the muscles, as I forced the fragments together. I decided, however, to wait, and see how much benefit would be derived from what had been done. I placed the leg in a fracture-box, to obtain from its use, what is a disadvantage in its employment, when we wish to cure fracture of both bones of the leg, without much shortening; as by its weight, it holds the lower part of the leg and foot fixed and immovable, while the body above, unless prevented, sinks down in the bed, causing the fragments to override each other, producing a tendency to great shortening as the fragments unite. I placed the patient in bed, supporting her back with pillows, and elevating the fracture-box also, so that between the two pressures of the fracture-box below, and the weight of the body above, the bones might be made to approximate as much as possible. She suffered no inconvenience from the operation, ordinary antiphlogistic treatment prevented any fever, and I soon gave her good nourishing food.

Union, however, did not take place rapidly, and motion could still be made at the point of fracture; so at the end of about four and a half weeks, I took the patient again before my class, etherized her, and broke up what adhesions had been formed, forcing the bones up yet more together, so as to make the fragments overlap, and then taking a long, thin, and highly tempered steel gimlet, made for the purpose, and with a movable handle, I pierced the integuments over the seat of fracture, screwed the fragments together, and removing the handle, let this pin remain for the purpose of exciting inflammation, so as to cause bony deposit, and at the same time to hold the fragments in as close juxtaposition as possible. The patient bore this operation well. I replaced her in bed as before, watching the inflammatory process which was now frankly excited in the leg, keeping it within proper limits so as to avoid erysipelas, with ointment of oxide of zinc and applications of lead-water and laudanum. When the pin, at the end of ten days, became loosened in the bones, I removed it. I kept the patient in bed about six weeks, having the gratification of seeing the limb becoming stronger daily. At the end of that time, I let the patient get up on crutches, and in eight weeks from the last operation, she walked into my clinic room without any other support than a cane, and I then discharged her from the hospital.

I lost sight of my patient entirely, though I had frequently inquired after her, being desirous of knowing the ultimate success of my operation. In the fall of 1872, after the period when the terrible fires swept over the great forests of the west, devastating that country, and rendering houseless and impoverished, so many unfortunates, who should walk into my office, but this very Catharine Smith, accompanied by a nice-looking young German, whom she presented to me as her husband. They were in great destitution, ragged, and almost shoeless. She told me that after she had left the hospital she married this young man, who was good looking and some years her junior. They then moved to Minnesota, where they bought a little place and built themselves a house, but that they had been burned out by the fires. Every one in their neighborhood was as poorly off as themselves, so they decided to work their way eastward, and she told me with triumph, that she had walked every step of the way on the leg that I refused to amputate. I was very glad to see her, and to have such a good report of the success of my operation. I lost no time in having a plaster cast taken of the leg which I here show you.

The deformity caused by the overlapping of the bones, is useful in the cast, showing where the original injury existed. The difficulty of saving the leg, by curing the false joint, was so great, that I was perfectly satisfied, and the patient also, with the result, in spite of this elevation which deforms the outline of the limb. She was so enthusiastic, that she said she thought it was the stronger leg of the two. At this moment, the husband and wife, with bettered fortunes, are residing in Delaware. From the successful result of this case, I would suggest the above-mentioned procedure in cases of ununited fracture of the tibia, when ordinary means have failed; the subcutaneous fracture of the fibula, being sufficient, without cutting out a piece of it, and then if required to excite inflammation, pinning the fragments together. It is certainly better than resecting the fractured ends of the tibia, and more certain, and no more dangerous than ivory pegging, or wiring the fragments together.

This past spring I have performed the operation again upon a Mr. W———, of Baltimore, before the class of Jefferson Medical College in the clinic. I was assisted by Prof. Gross and Emeritus Prof. Pancoast. The patient was of medium stature, very stout, and weighed over two hundred pounds. He was a patient of Prof. J. Aitken Meigs, who placed him under my surgical care. Mr. W——— fractured the tibia of his left leg, at the junction of the upper and middle third, some eight months previous, while in the State of New York, and had been confined to his bed and room ever since with the ununited fracture. Of this confinement he had become very tired, and as his business was suffering, he was extremely anxious to resume it, saying that if necessary, he would prefer having his leg amputated, to this continued inactivity. There was much preternatural mobility at the seat of fracture, and complete non-union, save possibly by a few slight ligamentous bands. With the history of this previous case in my mind, and knowing that the fibula acted as a splint, keeping the fragments asunder, I recommended the subcutaneous fracture of the fibula, as the *most* *sure* method of approximating the fragments of the tibia. I performed the same operation, with the exception that I did not pin the fragments, as on our consultation, we thought that the fragments of the tibia had approximated, and overlapped sufficiently, so as to render the pinning unnecessary. I placed the patient's legs in a fracture-box, as in the previous case. He bore the operation and the confinement well. There was no erysipelas, and in six weeks from the time of the operation, he got out of his bed upon crutches. As the union was not yet complete, though promising well, I applied a permanent fixed dressing of bandages, soaked in silicate of soda, and strengthened with strips of perforated tin, each about a foot long and two inches wide, using six of them, and arranging four so that two on each side of the leg should overlap each other, and being bent under the sole of the foot give greater strength to the dressing.

This the patient is now wearing with comfort, and instead of being bed-fast, is actively engaged in a business, which requires very early rising, and much exercise on the feet. As his health is improving, and the parts injured are stimulated by the exercise, it is probable that sufficient callus may be formed to render any further interference unnecessary. If from any cause the union shall be delayed, at his first leisure, I will apply the pinning process, and thus keeping the fragments in close apposition, at the same time cause sufficient inflammation to establish the cure.

In my consultation in this second case with Prof. Gross, I found that he had suggested a similar operation for ununited fracture of the tibia, and in the last edition of his great work on surgery, vol. 1st, page 944, he says: "I should have been tempted to cut away a portion of the fibula, and after refreshing the ends of the tibia, to approximate the bones by silver wire, fully anticipating a good cure."